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ABSTRACT

Steps toward developing a more constructive framework for linking research with educational practice in effecting school change are presented in this paper. To understand the problem of research-based change in schools, the process is reviewed from the following perspectives: the school and its practitioners; research-based knowledge itself; and linkages between practitioners and research communities. Optimistic findings are that teachers and policymakers do learn from research; however, research utilization works best in settings of collaboration and mutual support. Effective research-based programs for change are utilitarian, inspirational, provide immediate payoffs, and meet local needs. Unsuccessful plans for change view the practitioners as passive, are unclear, and assume a linear model of progression. Another problem is the inherent conflict that exists between knowledge-based school improvement efforts and the politics of federally supported research and development, if the latter adheres to an inappropriate vision of rapid, center-to-periphery dissemination. (77 references) (LMI)

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RESEARCH KNOWLEDGE AND SCHOOL IMPROVEMENT: CAN THIS MARRIAGE BE SAVED?

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April 1992

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Promoting change in schools is frustrating work. Those reformers who seek research-based change experience a particularly high level of frustration, perceiving that their successes are few and meager when contrasted with their aspirations.

This paper argues that many of our aspirations for the contributions of research to school change have been narrow and short-sighted. We often equate research use with school change, although in fact they are different things that only overlap in limited ways. One reason we do this is based on the dynamics of federal policymaking: the educational research and development (R&D) community frequently seeks congressional support by arguing that a practical payoff is--or should be--just around the corner. There are other reasons as well, rooted in our wishes for a more tightly specified science of schooling and in a lack of familiarity with the actual world of schools.

My purpose, however, is not to belittle the research or policy traditions that have brought us to this point of frustration. Rather, my aim is to identify the evidence and aspirations that underlie ideas about the contributions of research to educational practice, and to suggest some steps towards a more constructive framework.

There is an abundance of studies pointing to flaws in past attempts to bring about research-based change in schools, and the literature contains a few stories of success as well. This paper is not a comprehensive review but an attempt to touch on relevant research from several traditions. For purposes of organizing this discussion, I divide the relevant findings into three categories, based on their primary focus: (1) the school and the practitioners in it, (2) the research or research-based knowledge itself, and (3) linkages between the practice and research communities. Each category includes findings from many studies that, collectively, enrich our understanding of the problem of research-based school change.

The School

Reviews like this one customarily begin by discussing the outcomes of the policy interventions aimed at getting research into use. Policy interventions are the main focus; the context for their implementation is merely context. But ever since the literature on policy implementation burgeoned in the 1970s (Williams & Elmore, 1976; Farrar, DeSanctis, & Cohen, 1979), analysts of the change process in schools have increasingly argued that we must ground our perspective in schools in order to understand the likely effects of policy interventions (McLaughlin, 1987; Sarason, 1981; Sieber, 1979). Therefore, this paper begins inside the schools and then moves outward to examine properties of the research base and of linkage arrangements.

There are many ways of thinking about the world of educational practice. One is to focus on teachers' lives and work. Another is to analyze the properties of schools and school systems as organizations. Finally, one can focus on the relationships between education agencies and their environments, and the avenues for knowledge that are opened by these relationships.

Individual Teachers

Teachers are busy people, working under conditions of great uncertainty. They cope with a continual press of classroom events (Jackson, 1968; Brophy & Good, 1974). Because the outcomes of their work are usually intangible and remote at best, they are seldom sure about the merits of the many choices they make about curriculum and instruction (Lortie, 1975; Rosenholtz, 1989). Summarizing a series of surveys and observational studies of teachers, Fullan (1991) describes the issues that characterize teachers' professional lives:

> ...uncertainty and guilt about whether what they are doing has any value, the isolated joys of reaching individual students, the lack of reflexivity on either an individual or a collective basis, the perennial frustration of lack of time and unwanted interruptions.... (p. 122)

Alone in the classroom, each teacher spends most of the work day cut off from adult sources of personal and professional support. This theme of isolation recurs in the literature on teachers and teaching (Goodlad, 1984; Huberman, 1983; Lortie, 1975; Rosenholtz, 1989). Thus, while teachers might in some ways be expected to welcome authoritative knowledge that offers solutions to the many problems of practice that frustrate them, at the same time their exposure to outside sources of ideas is limited. They have little time and few routine avenues for seeking research-based knowledge. Moreover, their basis for trusting the soundness of knowledge has little in common with that of the researcher, whose customary procedure is to isolate and understand a manageable set of variables (Huberman, 1983).

Some 20 years of experience with teachers' response to school change has yielded lessons on the ways in which teachers do and do not attend to research knowledge and make changes in their practice. Here, as in several parts of this paper, I draw on the literature on innovations in schools. This literature is relevant because, while not all innovations are research based, some are. Moreover, the history of efforts to innovate tells us about what it would take to get schools to do anything differently--including using research more than they now do.

The Fallacy of "Resistance"

Early case studies of innovation in schools (Smith & Keith, 1971; Gross, Giacquinta, & Bernstein, 1971; Charters, 1973) told a dismal story of failure. The planned innovations collapsed in disarray; all concerned experienced enormous fatigue and frustration. Reviewing these studies, Gross (1979) points out that they shared a flaw in their analysis of teachers' response: they blamed much of the failure on teachers' resistance to change, assuming that a key challenge for would-be innovators was to overcome teachers' initial posture of stodginess and active or passive resistance. As Gross observes, however, the results of these case studies can be understood without assuming initial resistance on the part of teachers. The obstacles and frustrations arising during the course of implementation could themselves account for failure, even where teachers were initially willing to change.

The Teacher as Learner

Rather than construing teachers as the unwilling targets of change, Hall and his colleagues (1975) traced teachers' paths through the successful implementation of change. Their Concerns-Based Adoption Model captures the teachers' progress from immediate, personal concerns with the disruptive potential of the change, through mechanical use of the innovation's surface aspects, to routine use. Beyond routine use, they found teachers integrating the innovation into their repertoires and then, at the renewal stage, modifying it in an independent effort to improve its effectiveness with students.

A more active conception of teachers as constructors of change also underlies a current study of teachers' implementation of California's and Michigan's new mathematics frameworks. As Cohen and Ball (1990) describe it, the study includes a focus on teachers' knowledge of mathematics and the way it is learned, and their opportunities to absorb new conceptions of learning mathematics. In commenting on this work, Darling-Hammond (1990) emphasizes the centrality of teachers' knowledge and their opportunities to learn, and she criticizes policymakers for typically underestimating the time and resources that must go into teachers' learning.

The Routine Seeking and Use of Knowledge

While the studies just cited are based on examinations of the implementation of discrete innovations, another useful perspective focuses on teachers' customary routines, independent of policy interventions. Huberman (1983) has provided a valuable analysis of teachers' habitual ways of seeking and using knowledge. Based on an analysis of the contextual dimensions of teaching, he concludes that teachers' orientation to knowledge use includes the following factors:

- A focus on short-term outcomes. Teachers' own objectives and sources of professional satisfaction tend to revolve around immediate indicators of success--"pupil attentiveness, weekly work accomplished, or contingencies of daily classroom management" (p. 496).

- Belief in a lack of underlying order. Unlike researchers, who seek findings that impose a logical order on the complexity of instruction, teachers typically ridicule such simplifications. They often prefer nonrational explanations of classroom events and successes.

- Intuitive judgment. Based on their observation of the unpredictability of classroom events, teachers believe they have little choice but to proceed intuitively, arriving by trial and error at effective practice. They are happy, however, to enlarge the bag of tricks from which they can draw daily practice.

- Craft/artistic orientation. Lacking usable, conceptually based models of classroom regularities, teachers exchange craft knowledge rather than prescriptions among themselves.

- Personal reinvention, individualism. Teachers' isolation reinforces a tendency to arrive at practice mastery through individual trial and error.

Summing up, Huberman concludes that teachers have a pragmatic desire to acquire a large array of tools to deal with unpredictable contingencies, that they value experiential data from fellow practitioners, and that they are especially responsive to knowledge conveyed with an idealistic or altruistic flair. Citing teachers' responses to presentations by the developers of exemplary practices (which had been validated through evaluation evidence at the original site), he says: "In fact, the most salient recollections of awareness sessions by teachers are less of the properties or techniques embedded in a new instructional practice than of the inspirational qualities of the developer" (p. 502).

How Might Preservice Education Affect Teachers' Knowledge Use?

The preservice preparation of teachers does not now dispose them to be particularly eager consumers of research knowledge. The faculty members who educate most of the nation's teachers are seldom active researchers themselves (Howey & Zimpher, 1989). The integration of theory and practice is not strongly emphasized in teacher preparation--and neither, for that matter, are the skills needed in order to change schools (Fullan, 1991). Generally speaking, the preservice education of teachers reinforces a view that the prospective teachers began to develop when they attended school as children: that things don't change much in schools, that education is about imparting facts and algorithms, and that the execution of standard operating procedures in the classroom is a more worthwhile focus than reflection on practice (Kennedy, 1991).

This tradition in preservice education is at odds with the views of education researchers in elite institutions, who would prefer to see teachers develop a very different approach to their work--based, for example, in research on children's cognition. Some pilot work in preservice education seeks to develop teachers' capacity to reflect on and use research in this way; among the techniques these programs use are partnerships between teacher-learners and mentors who are disposed to approach their work in thoughtful ways (Kennedy, 1991). But the goal of the more thoughtful approaches to teacher preparation is not to stuff the prospective teachers with research knowledge. Where these approaches intersect with the idea of using research is that they seek to dispose teachers to a stance of inquiry and reflection, in which knowledge use may become part of a regular professional repertoire.

Enhancing Professionalism: Broadening the Focus Beyond Technique

Teachers use their knowledge in constantly changing situations that call for the exercise of judgment. Indeed, for teachers, knowing when and how to apply new knowledge is what makes the knowledge effective (Showers, Joyce, &

Bennett, 1987; Richardson, 1990). The experienced professional can best be thought of as a problem solver; increasing teachers' capacity to decide how to handle particular situations is at the heart of increasing their expertise (Darling-Hammond, Wise, & Pease, 1983; Hopkins, 1990; Schon, 1983).

What does the literature say about situations in which teachers exercise their capacity to apply knowledge? An innovation currently gaining a great deal of favorable attention, Reading Recovery, offers an instructive model of the teacher as an active exerciser of professional judgment (Wechsler, 1992). Through a sequence of formal coursework, apprenticeship, and continuing professional development, Reading Recovery teachers develop and refine their skills in applying the program's principles--which are rooted in cognitive science--to daily work with children. The program does not provide prescriptions; instead, it equips teachers with a knowledge base and a formal structure of opportunities to reflect on ways of applying knowledge.

Some studies have identified settings in which teachers routinely pay attention to increasing their professional competence. As Fullan (1991) summarizes several studies, the presence of collaboration is critical:

> Within the school, collegiality among teachers, as measured by the frequency of communication, mutual support, help, etc., was a strong indicator of implementation success.... Significant educational change consists of changes in beliefs, teaching style, and materials, which can come about only through a process of personal development in a social context. (p. 132)

Rosenholtz (1989) describes the 13 schools, out of a set of 78 that she studied, in which teachers had an unusually high belief in "a technical culture," emphasizing the improvement of practice through knowledge. She found in these schools a culture of collaboration, encompassing principals as well as teachers, with unusually frequent opportunities for the exchange of ideas. In addition, the schools had norms of experimentation and analysis. Similarly, Little (1982) describes the elements of collaboration in schools that lead to practice improvement: teachers talk about teaching practice; they observe one another's work; and they work with each other and with administrators on planning, designing, and evaluating teaching materials.

In this examination of settings where teachers extend and apply their professional competence, we have moved beyond a focus on the individual practitioner. We have also moved beyond a definition of innovation or knowledge use as essentially a technological matter. This progression recapitulates a development in the literature on school change, identified by House (1979). From an initial effort to explain and advance good practice by upgrading the technical skills of individual teachers, researchers and advocates arrived at a different framework, one emphasizing the political dimensions of change, especially in intra- and interorganizational relations. House also points to a third framework, the cultural perspective, which aims to improve our descriptions of the typical milieu of schools and teachers and to contrast its norms and values with those of "technocrats."

Schools and School Districts as Organizations

Early analyses of innovation (Rogers, 1962; Havelock, 1969) drew heavily on the literature of rural sociology, where the individual farmer is the one who decides to use a new product and then does so. It soon became apparent that this research tradition was of imperfect relevance to education, where the individual practitioner is far more constrained by organizational incentives and mandates (see, for example, Gross, 1979). The adoption and implementation of innovations have since been analyzed within an organizational framework that focuses on the school, the school district, or both.

Within each school, the process of change requires both leadership and management (Louis & Miles, 1990). Thus, the principal--whose critical contributions to school quality are a staple of the effective schools literature--has countless opportunities to set a tone that favors or impedes practice improvement. Although principals' days are typically fragmented into a string of brief interactions and situational decisions, effective principals do not approach each of these in piecemeal fashion but instead apply a consistent set of criteria to them, based on a vision of the school and its goals (Leithwood, 1990). Fostering the collaborative norms described by Rosenholtz (1989) and Little (1982) can be part of such a vision.

The school district offers conditions, in the form of central priorities and staff resources, that favor or impede change. Top administrators' commitment to a particular change is a powerful lever on adoption and implementation (Huberman & Miles, 1984; Louis & Rosenblum, 1981). Central-office units that provide staff development, curriculum coordination, and the coordination of categorical programs can also offer some of the wherewithal of change (Cox, 1983). For example, these offices organize programs of professional development that may both impart knowledge and give teachers an opportunity for collaborative discussions; they can obtain the needed endorsements from district and building administrators; and they can work with teachers to assist and improve their use of new practices. They also serve as gatekeepers for outside knowledge (Turnbull, 1981).

Participatory and Coercive Strategies

At one point in the history of innovation research in education, it was fashionable to declare that, "Top-down change doesn't work." Findings from a major study of change efforts (Berman & McLaughlin, 1978) showed that the context for implementation exerted crucial influence. These findings, perhaps combined with the American conviction that governments derive their just power from the consent of the governed, encouraged the blanket assumption that administrators could only effect change through participatory, noncoercive means.

However, studies emerging in the 1980s contradicted this view and reinstated the importance of mandates as a change strategy. Louis and Rosenblum (1981) identified the centralization of decisionmaking authority as a factor associated with change in districts. Huberman and Miles (1984) found

that top-down decisions were a key factor in the more far-reaching, successful changes they studied.

As a result, Purkey and Smith conclude that districts seeking school improvement should combine two strategies of "top-down policy and bottom-up planning and implementation" (p. 364). Central policymakers in the district have the authority and indeed the obligation to issue mandates, but they must accompany these with opportunities for participatory responses based on the development of improved capacity across the board. Or, as Fullan (1990) states the same conclusion: "Neither centralization nor decentralization really works. Mandates make people resist change. Leaving it to the school denies the benefits of coordinated support and problem solving. What does work is interactive pressure and support.... Change should be a negotiated process" (p. 211).

The Environment of Schools and Districts

The challenge of understanding strategies that are simultaneously top-down and bottom-up appears again as we look beyond the individual school or district in order to explore the environmental incentives and disincentives for knowledge use. One early analysis of this topic concluded that the relationship of school systems to their environment discourages serious innovation, while encouraging the superficial adoption of changes that give the system an up-to-date, professional, or responsive appearance--for example, through the purchase, if not the use, of closed-circuit television (Pincus, 1974). The prevailing incentives, in this view, favor the symbolic or cosmetic adoption of the trappings of reform.

Subsequent research has shed further light on the incentives for symbolic adoption, while also revealing environmental forces that may promote more meaningful change. Symbolic adoption may contribute to the career advancement of key administrators, propelling them out of the district (often to the serious detriment of the partial changes they leave behind) when outside recruiters notice their innovativeness (Pauly, 1978; Huberman & Miles, 1984). In the Experimental Schools Program of the 1970s, which was intended to support districts' planning and implementation of comprehensive change, several superintendents successfully managed their districts' relationship with the local school board and the community by creating the appearance of innovation (Herriott & Gross, 1979).

Federal programs offer a classic opportunity for districts to benefit from the symbolic adoption of innovations when they provide "soft money" to support reform. Many announced innovations represent nothing more than successful grantsmanship. The RAND study of Change Agent programs found that the opportunistic response to funding was widespread, and that an opportunistic orientation meant that no real implementation would result from adopting an innovation (Berman & McLaughlin, 1978).

On the other hand, the incentives arranged by policymakers can also promote genuine change. Government mandates can make schools and districts change their behavior and, over time, can bring new ideas into professional

currency (McLaughlin, 1990). An example is the cumulative effect of federal programs aimed at special student populations, which have supported and sustained the idea that some students deserve extra instructional resources (Knapp, Stearns, Turnbull, David, & Peterson, 1983). Categorical programs bring not only the mandates that create local incentives for change (Louis, Dentler, & Kell, 1984), but also the vertical networks among professionals in local, state, and federal offices that can transmit new knowledge and practical assistance (Turnbull, 1989; Firestone 1989).

Knowledge Transmission Through Policy Avenues

So far, I have focused on innovation and the direct use of knowledge by school practitioners, and the circumstances that favor or impede these. However, the connection of schools with larger policy systems suggests an important indirect route through which research knowledge can reach practitioners: by informing policymakers, research can affect the design of programs--or the conversation about effective practice--and hence influence local educators. Analyzing the uses of analytic information by congressional staff, Weiss (1989) identifies the following ways in which studies demonstrably affect legislation:

- Providing political ammunition and thus strengthening coalitions or persuading undecided members to sign on to a policy initiative
- Reordering the agenda by moving a problem up (or down) on the policy agenda. (Weiss cites the example of adult illiteracy, which lost some of its salience as an issue when a study showed it was less severe than had been popularly believed.)
- Affecting the design of activities by leading to specific legislative provisions

For Congress, research and evaluation can add momentum to policy initiatives. A noteworthy recent example is the Perry Preschool Study, a longitudinal study of a very small number of children that has been repeatedly cited as support for all early-childhood interventions such as Head Start. (This is a somewhat ironic victory for researchers, since that evaluation actually focused on an intensive program quite unlike most Head Start programs.)

Research knowledge can also be credited with specific features of a program reauthorization: the congressionally mandated studies of Title I/Chapter 1 have been praised as meeting a congressional need for specific guidance. The local educators who implement the resulting programs become secondary users of knowledge, despite the inevitable attenuations of program implementation.

Although it is more rare for studies to provide Congress with new ways of thinking about issues, this process of "enlightenment" is one way in which knowledge affects policy (Weiss, 1978). Over time, research can shape public perceptions of problems and of ways to frame the options for problemsolving. Policy officials of the executive branch draw on research surprisingly often

as they fine-tune programs (Weiss, 1980), and programs, in turn, affect the incentives and thus the behavior of educators.

Knowledge and Its Transformations

Some studies of knowledge use in education have been particularly helpful in illuminating the characteristics that make the knowledge itself more or less useful. Under the general heading of knowledge I include research findings and research-based innovations in curriculum, instruction, and organizational matters in education. A central issue here is the extent to which externally developed knowledge is capable of solving problems of practice in schools. The studies and analyses that have advanced our understanding of research knowledge and its contributions include--moving from the narrowest conception of knowledge to the broadest--examinations of the way schools implement innovations, analyses of the quality of the knowledge base that has typically undergirded prescriptions for educational practice, and studies of the diverse effects of knowledge on practice and policy.

Innovations and the Literature of "What Went Wrong"

One way of learning how knowledge may contribute to educational practice is to look at what happens in schools or districts that attempt to change on the basis of external knowledge. The literature on innovations in schools, while not dealing exclusively with research-based innovations, provides evidence on an important point: do practitioners inevitably transform the innovation in fundamental ways as they use it? This is important because it can invalidate the whole premise of bringing tested findings or practices into schools.

Throughout most of the 1970s, beginning with the studies of Smith and Keith (1971) and of Gross, Giacquinta, and Bernstein (1971), researchers examining innovation in schools were centrally concerned with documenting and accounting for failure. Their case studies analyzed what had gone wrong, sometimes suggesting that the route to successful change would be to do the opposite of everything the would-be innovators had done. By the time of the Change Agent study (Berman & McLaughlin, 1978), this literature had dealt a severe blow to the aspirations of those who wanted to promote research-based change in schools, for it seemed to say that innovations would never survive intact. "Mutual adaptation" characterized the implementation process: A new educational program might change the school into which it was introduced, but the school would change the program, too, implementing something that would ultimately look quite different from the original design.

However, these conclusions are best understood as applying to one particular type of research-based innovation, which Gross (1979) calls, "an assortment of untested, fuzzy, and ill-designed innovations that lacked clear operational procedures or guidelines" (p. 28). The great bulk of sites in the Change Agent study set out to implement projects that were locally designed and that had only minimal support in the form of outside expertise (Datta, 1981). While many of these projects were based on ideas gleaned from

research, such as differentiated staffing, they did not reflect efforts to introduce well-developed models of practice into new settings. Thus, as Datta observed, it was not appropriate to draw gloomy conclusions about all research-based change on the basis of these studies. When changes were better specified at the outset, perhaps the results would be different and more heartening to the research community.

Against this backdrop, the massive study of Dissemination Efforts Supporting School Improvement examined in more detail the issue of fidelity to an original model (Crandall and Associates, 1982). The dissemination programs studied shared a strategy of installing the key components of exemplary practices in adopting schools. Information, staff development, and continuing assistance were provided by people who specialized in these functions. The results of a survey of adopters showed a degree of fidelity to the original design that placed the possibility of program implementation in a new light: on average, teachers were using the new practices in a way that developers would rate somewhere between "acceptable" and "ideal"--in other words, while mechanical replication was not taking place, significant learning evidently was. McLaughlin (1991), commenting on this study's findings about the effects of externally developed programs and external consultants, characterizes the results at the local sites as "adaptive implementation strategies that remained true to the project's core philosophy and central strategies" (p. 14).

In fact, the idea that innovations would be put to work intact, with little adaptation, never fit the reality in education or other fields. Even in agriculture, farmers assert that they use hybrid seeds and other apparently technological innovations in ways that differ from the developers' original prescriptions (Rogers, 1978). Reviewing the evidence on this phenomenon across fields, Rogers concludes that reinvention is a critical and inevitable step in implementing an innovation.

Assessments of the Knowledge Base

As research on implementation has evolved from analyses of "what went wrong" to a more elaborated understanding of fidelity to a model coupled with reinvention, there have also been competing analyses of the flaws of the knowledge base that educational research offers practitioners.

Poor Specification

Some observers of the implementation process and its many failures have concluded that the knowledge base in education is woefully short on clear prescriptions. For example, Hollifield and Slavin (1983, p. 586) claim that "the real key to the ineffectiveness of all our dissemination models" may be "inadequate technology"--not weak linkages between R&D and schools or a lack of will or capacity for implementation in schools. By inadequate technology, they mean products or programs that are not specific enough to be understood, have no clear description of procedures for use, or offer "no conclusive advantage over the status quo" (p. 586). As evidence for this view, they cite the disappointing record of implementing what Gross called "fuzzy" research-

based innovations, and they contrast this record with their own success in promoting the use of student team learning (a version of today's popular innovation, cooperative learning). Their recommendation, which Slavin has reiterated in later analyses (1989), is for more systematic R&D aimed at developing well-articulated and effective models of practice.

Excessive Specification

A directly contrasting view comes from observers of staff development programs who contend that prescriptions for practice have only limited utility in improving teachers' work. A summary of research on teachers' professional development concludes, disapprovingly: "Relatively simple teaching skills and behaviors (such as questioning and giving feedback) have received much more attention than have teaching strategies, curriculum implementation, or academic content" (Showers, Joyce, & Bennett, 1987). The predominant goal of professional development is the development of technical skill rather than reflective capacity, despite the need for teachers to exercise judgment continually (Fenstermacher & Berliner, 1985; Griffin, 1986).

A major study of staff development in California concludes that the centralization of staff-development resources under district control creates a ready market for well-packaged presentations that have some relevance to the district's entire, diverse teaching force (Little, 1989). This study discerns a trend in the content of professional development away from the simplest and most generic teaching behaviors and toward a combination of pedagogy and curriculum. However, because of the centralized decisionmaking on staff development and the resulting tendency to cast the teacher in the role of passive, individual consumer, the field remains dominated by highly standardized and prescriptive content. This in turn leaves it vulnerable to the dark side of well-specified innovations: gimmicks and fads.

Thus, while both Slavin and Little lament the fact that change efforts in education are prone to faddism, their solutions are essentially the opposite of one another. To summarize: Slavin, from the R&D tradition, argues for more expertly engineered innovations in practice, authenticated by expert developers and less corruptible by faulty implementation. Little, whose view of school change centers on a community of inquiry among faculty, sees the importation of packaged programs as a tradition that can be inimical to professional growth. Does R&D give the field too little specification or too much?

A Thin Product Base

If we imagine a teacher or administrator who wanted to be guided by the findings of research (setting aside the question of whether this is a plausible vision), would that person find the knowledge base in educational R&D sufficiently comprehensive? Ten years ago, the answer was no. While recent research has not directly addressed the question, the lessons emerging from the National Institute of Education's Research and Development Utilization (RDU) program are instructive.

In the RDU program, linkers in seven networks of organizations and individuals provided several kinds of help to schools and districts. They set out to offer the existing products of R&D, a process for identifying specific educational problems and likely solutions, and support that extended into implementation. The RDU evaluation suggested that the products emerging from federally supported R&D did not constitute a product base that was fully appropriate and adequate to meet the needs of potential users (Louis, Rosenblum, & Molitor, 1981). Originally, one rationale for the RDU program was to get NIE's products and findings into more widespread use. During the course of implementing the program, it became clear that the R&D base did not contain solutions for many of the educational problems that people in participating schools wanted to solve.

The linking agents funded by RDU resolved the difficulty by offering other products, some of which were the locally developed programs whose evaluations had been validated by federal reviewers so as to permit the programs' inclusion in the National Diffusion Network (NDN), but others of which were neither research outcomes nor validated programs. By the spring of 1979, three years after the RDU program started, the 194 known product adoptions included 120 adoptions of products that were not known to have been validated in any way. There were 47 adoptions of NDN programs, 12 adoptions of programs that had been validated locally, and just 15 adoptions of products or programs from the NIE catalogue that had originally provided a reason for starting the RDU program. These R&D products clearly offered a very limited repertoire of solutions to the problems that educators wanted to solve. Furthermore, their implementation was, on the whole, less successful than that of the non-R&D resources available through the RDU program.

The Limited Utility of Products

One conclusion of the RDU evaluation was that the array of R&D products fell short of meeting educators' needs. Another was that products alone were an inadequate basis for helping schools; the personal intervention provided by dissemination and technical assistance were at least as important as the quality of the product.

The evaluators attempted to distinguish the independent effects of the product or program disseminated, the techniques used by the disseminators, the local problem-solving process, and the pre-existing characteristics of the adopting schools. The outcome criteria included local perceptions of organizational and personal effects, incorporation of the product, incorporation of the problem-solving process, scope of implementation, and extent to which an instructional problem was solved. On most of these outcomes, the combination of intervention strategies--characteristics of the product, dissemination and assistance techniques, and problem-solving process --was a more powerful predictor of success than any one strategy independently. Further, the evaluators accounted for the greater implementation success of the non-R&D products by the fact that personal training and assistance techniques had been developed for the NDN programs.

This does not mean that research-based products are beside the point. It does mean that knowledge does not command automatic allegiance, and that

personal assistance makes a considerable difference in research use. This conclusion has policy implications, which are discussed later in this paper. It also underscores the fallacy of expecting knowledge use to be a simple, direct matter. The literature on knowledge and its use by policymakers and practitioners belies such an expectation.

What Knowledge Use Tells Us about Knowledge

For many years, analysts have puzzled over the fact that research, evaluation, and other analytic products seldom sway decisions. The literature on this phenomenon contains a certain amount of gnashing of teeth over policymakers' obstinacy, willful ignorance, and the like, but the more thoughtful analyses explore the instances of a clash or a good fit between social-science knowledge and decisionmaking.

For example, it has been observed that the research or evaluation studies conducted around a particular policy problem rarely converge in prescribing a clear course of action. Instead, they more often produce discrepant findings traceable to discrepant paradigms. Newer studies expose the fallacious assumptions of older ones, sometimes on methodological grounds and sometimes through creating finer distinctions in defining the original policy issue. This has been the case with research on school desegregation (Cohen & Weiss, 1977).

Within one program, the Experimental Schools Program (ESP) of the early 1970s, the sponsoring agency hoped that a large investment in evaluation would improve the management and effectiveness of the program by informing both local grantees and the federal agency. However, the evaluation "...contributed little to practice at any level of education. Its only appreciable effect was to vastly increase conflict within the ESP program, and to raise management problems all along the line" (Cowden & Cohen, 1979, p. 68). Local administrators saw the evaluation as an unwelcome federal intrusion, which could reflect poorly on their work but would not give them helpful information. The federal agency, in an increasingly defensive posture concerning the whole program, frequently changed the evaluation design in an attempt to salvage something respectable. It was, all in all, a sorry spectacle--due in part to weaknesses of the specific evaluation designs, but more generally to a highly ambitious plan that was at odds with what any evaluation could contribute to an ongoing program. Cowden and Cohen observe:

> As the poor results of applied research became apparent in particular projects, federal administrators expanded the tasks of research even further, in a search for ways to compensate for the unexpected failures.... This debases the modest jobs that social research can do, by setting unattainable tasks for it. It also has led to an increasing tendency to confuse scientific analyses of practice with what teachers and administrators actually do. (pp. 95-96)

However, despite (or because of?) the fact that research does not customarily give prescriptions for action, we do find that practitioners and policymakers report that research knowledge is of use to them. The uses are

of several types; research findings may provide ammunition in turf battles as well as professional enlightenment and self-improvement (Huberman, 1987; Weiss, 1980). Taking a realistic view that acknowledges mixed motives on the part of users, we can examine the properties of knowledge that make it most user-friendly.

In the policy realm, officials of federal agencies are most likely to use research findings that pass two tests: a truth test and a utility test (Weiss, 1980). Each has two chief components. Truth is established through a combination of technical research quality and the compatibility of the findings with the user's prior knowledge and experience. A study can pass the utility test by offering explicit direction for incremental reform or, surprisingly, by challenging conventional assumptions. Thus, research does not have to reinforce every assumption of an operating program; indeed, research that challenges assumptions in ways that make sense to policymakers may be extremely powerful in the sense of enlightenment.

For practitioners, the tests are similar, although the enlightenment function of information is not so well established. Teachers like to scan their environment for improvements or alternatives to their current practice (Huberman, 1985). Truth and utility tests among teachers typically revolve around craft validation: if another teacher vouches for the idea or practice, it may be worth trying; the intuitive fit with the teacher's own past experience is also important; and, if the teacher tries an innovation, the immediate results with students may seal its acceptance or rejection. While these tests do not automatically favor research-based knowledge, they do not disqualify it from credibility either.

Similar themes recur in a study of the outcomes of dissemination assistance in education, where the knowledge was chiefly specific innovations based on research and the audiences were a combination of state and local policymakers and local practitioners. As the investigators summarize the characteristics of knowledge that were strong predictors of use:

> In the content domain, the best single predictor of knowledge use and gain was a factor we called "reality." It reflected our ratings of the extent to which the ideas and information ... seemed to fit the real-world contexts of targeted recipients. The rating items included whether the content was: field-developed or field-tested, compatible with the concerns of users, adaptable to local conditions, accessible intellectually for the inexperienced or uninitiated user, observable by users, and inspirational (in the sense of sounding idealistic or altruistic themes). (Louis, Dentler, & Kell, 1984, p. 13)

Another important factor was "utility," defined as "the extent to which information provided specific guidance for applying new ideas in one's own work and/or bringing about necessary collective changes on the part of an entire agency or work group" (p. 13).

These definitions of reality and utility do not fit all of social science, but the fact that some research-based knowledge can be described in

these ways does suggest that there are useful distinctions to be made, and that we need not dismiss the relevance of research to practice.

Links Between Research and Practice

The catalogue of reasons why research doesn't often transform practice continues, as we analyze the history of efforts to link the two worlds. As this paper has already shown, practice and research-based knowledge do not necessarily mesh naturally. Recognizing the gulf between the two, federal policymakers have launched a series of programs and institutions in the effort to bridge it. These efforts have brought their own dilemmas and lessons about the contributions of research to practice, which I now discuss.

The U.S. Office of Education and R&D: Finding a Federal Role

As early as the 1960s, competing ideas about the most effective and appropriate federal role in educational R&D arose in the form of dilemmas that persist today. Should the R&D institutions respond primarily to central control, to the demands of a discipline, or to the field? How could service be combined with science? These dilemmas of research and service shaped the early design of the R&D centers, the regional laboratories, and the Educational Research (later Resources) Information Center (ERIC). For purposes of this paper, I am primarily concerned with the choices made in designing the relationship between R&D institutions and practitioners.

In the federal government's rush to address social problems under the Johnson administration, education had a prominent part. The post-Sputnik sense that the nation's schools needed transfusions of new ideas and methods was a significant part of the thinking about an education agenda. A task force chaired by John Gardner of the Carnegie Corporation, prescribing a massive overhaul of educational practice, recommended late in 1964 that the government establish a system of institutions to invent, engineer, and disseminate new ideas. One element of the system would be an expanded set of R&D centers, some of which already existed. Another would be laboratories, their name borrowed from the Atomic Energy Commission's (AEC's) national science laboratories such as Argonne and Brookhaven. Their work would include development, dissemination, experimental schools and other pilot programs, and teacher professional development.

When the Elementary and Secondary Education Act of 1965 broadened the research authority of the U.S. Office of Education (USOE) and authorized the construction of laboratory facilities, many operational issues remained unresolved. In particular, there were three competing models for the definition of laboratories (Dershimer, 1976). One was the curriculum-development projects supported by NSF, in which university-based developers in a scientific discipline created curriculum materials and professional-development programs. Another was the AEC's national laboratories, which engaged in scientific research. A very different model was the Agricultural Extension Service, in which extension agents developed long-term service

relationships with farmers and brought useful research findings to their attention.

In the early days of laboratories, there was a decided tilt away from the national orientation of the AEC model in favor of service to a region. With real fears of federal control being stirred up by the government's new activism in education, the idea of regional service appeared nonthreatening--and offered the prospect of building congressional support for the laboratories (Dershimer, 1976; Turnbull, forthcoming).

The centers and laboratories were sometimes seen as links in a chain from research to practice--a chain visualized in a linear fashion as the Research, Development, Diffusion, Adoption (RDDA) model (Guba & Clark, 1965). This model, ritually derided as a straw figure in papers like this one for the past 15 years or more, had the premise that research (from the centers) needed to be engineered into practical products (by the laboratories, for example), then handed to the field, where the products would be adopted and used. The connection between knowledge and practice could strengthen as laboratories built relationships with educators in their regions, testing and refining their products in preparation for wider distribution. The interactions, loose couplings, and backward loops all along the line were not part of this model; it had the virtue of conceptual clarity but the vice of misrepresenting reality.

Indeed, the model's developers recognized its deficiencies as quickly as everyone else, and they published a revisionist view in 1975. This new model, which they termed the configurational perspective, emphasized the number and diversity of interacting institutions that together produce educational knowledge and improvement (Guba & Clark, 1975).

During the reign of the RDDA model, however, federal signals turned the work of the new institutions toward a product-based view of educational change. Because the apparently slow pace of school improvement was angering key members of Congress, "within two years of the start up of the labs and centers, the program managers [in USOE] asked all the labs to create tangible products and they closed down those labs that couldn't make the transition" (Hutchins, 1991). The notion of service to a region was eclipsed (although it would reappear in the 1980s). Once the creation of free-standing products became central to the laboratories' mission, the federal sponsors were presented with the problem of showing Congress that the products had been effectively disseminated.

Linkage Programs and What Was Learned from Them

In 1972, many R&D programs in USOE and related dissemination efforts were shifted to a new agency, the National Institute of Education (NIE). Several key figures in the agency's creation, committed to the view that past educational R&D had been second-rate at best, perceived that their challenge was to improve the caliber of research (Dershimer, 1976; Thompson, 1982). Early on, however, the agency experienced intense political criticism. Linking R&D to the solution of educational problems became a near-term

imperative--although many within NIE understood that it was no simple matter.

Dissemination Programs for Knowledge Use

The School Practices and Service Division of NIE sponsored a series of programs and studies that grew out of several observations about existing R&D. One was that its use in schools would not be a simple matter. R&D products, unlike textbooks, would not find their way into classrooms through the routine work of publishers' sales representatives and local curriculum committees (Turnbull, Thorn, & Hutchins, 1974). Instead, the innovative characteristics that made these products interesting to the R&D community posed substantial dissemination challenges.

A marketing approach seemed to offer one road to a solution--with marketing defined broadly, not as sales but as a set of decisions about users' needs, information resources, and distribution channels. However, the professors of marketing initially knew little about schools, and it showed in their analyses. Someone else would have to figure out better ways to link R&D with schools.

This division of NIE started two major programs, Research and Development Utilization (RDU) and the Research and Development Exchange (RDx) in an effort to improve--and understand--processes of knowledge use in educational organizations. Research and evaluation on these programs' strengths and weaknesses have yielded some interesting insights about ways of improving practice.

The RDU program, as already described here, offered R&D products (and later other exemplary practices) and personal support for school change. Some conclusions of the RDU evaluation have already been discussed here: that the product base of educational R&D was embarrassingly thin; and that the combination of product characteristics, dissemination strategies, and local problem-solving process explained success better than any one of these ingredients alone (Louis et al., 1981). In short, while it was unrealistic to imagine that the products of R&D could improve schools by themselves, they could play a part in a coordinated strategy that included personal assistance along with knowledge resources.

Shortly after starting the RDU program, NIE also launched the RDx, a program that enlisted laboratories and one R&D center in a fairly elaborate system for collaborative dissemination efforts. One of the program's aims was to maintain and strengthen the laboratories' capabilities in dissemination, on the grounds that dissemination had been losing out to development in the competition for federal dollars (Hutchins, 1989). This program had some features in common with NIE's State Capacity Building Program (SCBP), which funded state education agencies to increase and coordinate their work in dissemination; in both programs, one aim was to enlist existing agencies as linkers who could bring new knowledge to schools. Thus, it made sense to study these programs together under the umbrella of "general-purpose dissemination assistance," which Abt Associates did in the early 1980s.

Findings about linkage from this evaluation included the following (Louis, Dentler, & Kell, 1984):

- Dissemination assistance has observable effects, ranging from individual learning by teachers or administrators to the reported use of new classroom techniques--with results that included higher student engagement

- Dissemination assistance that focuses intensively on the individual school can be particularly effective, but more modest service strategies such as sending out written materials can also result in moderate levels of use and gain

- Information use depends on "a supporting social process. In other words, interaction with colleagues and peers about the value of information, its potential utility and how it might actually affect practice or planning was extremely important in moving from relatively inactive levels of use (learning something new) to more active levels (deciding to change a practice or a policy)." (p. 11)

- "Trickle-down" dissemination does not work particularly well; going directly to the intended user works better

The dissemination programs of NIE, then, produced some success stories about the importation and use of research knowledge in schools. Buttressed with personal assistance, information could play a part in changing practice and policy. People from outside schools could participate in and contribute to the social process of learning within schools. Some progress was made in analyzing the skills that go into linking knowledge and practice, although this has remained largely a matter of craft knowledge--much like teaching itself.

Models of Linkage

Research on the work of linkers gives us an idea of the different types of help they offer in knowledge use and of the skills and arrangements that make their work more effective. A typology of the functions linkers perform includes the following (Butler & Paisley, 1978; Crandall, 1977; Piele, 1975):

- Finding and organizing resources by collecting and analyzing information

- Monitoring the availability of products and marketing or disseminating products as appropriate

- Participating in the diagnosis of local problems

- Facilitating a local process of problem solving

- Providing content-specific advice

- Evaluating the early results of a change, or helping clients do so
- Contributing to the client's continuing capacity to solve problems

Among the skills and conditions that facilitate linkage are these (Yin & White, 1984; Corbett, Dawson, & Firestone, 1984; Louis et al., 1984):

- Skill in figuring out how to work with local context and school conditions, including resource availability, possible sources of tension and disruption, and staff expectations
- Face-to-face communication with those who will be making changes
- A sustained relationship with clients
- A repertoire of different interventions that can match the local context, including content-specific training for some situations and more generalized assistance for others

Finally, research on linkage underscores the fact that it can be understood and improved. The combination of information, assistance, and sustained work with the implementing organization does produce change (Crandall and Associates, 1982).

Locally Based Change Programs

While much of this work on dissemination and linkage was going on, other offices in NIE took a somewhat different approach to research-based school improvement, attempting other ways of connecting schools with outside resources. Their premises grew out of the observations that schools seldom changed, still more seldom did so in rationally planned ways, and essentially lacked the capacity to respond to whatever wisdom resided in R&D. Yet contradictions arose in the work because the sponsoring offices, as part of NIE, were institutionally committed to research as a key element in a strategy for school improvement.

One program that lodged in NIE after beginning in USOE was the Experimental Schools Program (ESP). In its quest for comprehensive change in local school districts, the program experienced major breakdowns in implementation, accompanied by shifting signals from Washington to each site and growing confusion and even hostility on the part of local participants (Herriott & Gross, 1979). One set of problems arose from the idea that change should be comprehensive. Local districts submitted a series of plans for changes they would like to make, only to have them rejected as insufficiently comprehensive. After years of pulling and tugging over the issue, the participating districts ended up with (at most) assortments of changes sharing a common funding source, much to the disappointment of the planners who had sought a grand design from each district (Cowden & Cohen, 1979; Herriott & Gross, 1979). Another source of disappointment, already discussed here, was the idea that a major investment in evaluation would improve the rationality and hence the educational quality of the effort.

Similar problems plagued the Urban Sites/Documenting Technical Assistance (DTA) program at NIE. This program, which began with the intention of providing five years of support and assistance to urban districts committed to improving their problem-solving processes, collapsed in disarray after two years. Little headway had been made on the local issues that the funded projects were supposed to tackle. Moreover, as in ESP, a substantial investment in technical assistance and in documenting that assistance had yielded little to brag about. In retrospect, it was clear that the ambitions of this program had been impossible to fulfill:

> The Urban Sites/DTA project was undertaken because schools were perceived to be unmotivated to address their problems in a thoughtful way. Yet, if schools are insufficiently motivated for sustained, reflective attacks on their problems, it seems still less likely that they will be motivated to "develop problem-solving capacity." (Thompson, 1982, p. 124)

Further, the program's assault on local problem solving had been accompanied by a no-less-daunting mission of linkage, which was defined as developing knowledge about ways to improve problem solving and then applying this knowledge in helping other schools (Miles, 1980). Or, as Miles sums up the difficulty of the mission: "non-routine, complicated, non-tangible items not well embedded in an organized knowledge base had to be transferred by a non-legitimated, poorly-supported linking agent to users who were far from eager for this sort of assistance" (p. 52). Mirroring the sites' lack of progress in solving their problems, the linkers accomplished little in transferring problem-solving techniques across sites.

Among the many lessons of these experiences are a renewed sense of the difficulties that face a government agency trying to make a dent in problems of local practice. Contracts with school districts or other local agencies lead to ritual tussles over planning and adherence to plans, leaving little room for local improvisation and encouraging the government agency to impose its buzzwords (such as comprehensiveness) on an evolving project. For NIE, the problems were compounded by its commitment to social science as a problem-solving instrument, without enough reflection on which tools of social science might offer the most constructive possibilities. And both government monitoring and government-funded research took on a frantic and still more dysfunctional edge as NIE tried to demonstrate a rapid payoff from its investments.

Do We Have Workable Concepts of Research-Based Change?

After the many disappointments and the small victories of the past 25 years or so, what do we know about the possible contributions of research to school improvement? I would argue that we know quite a bit, and that not all of it is negative--although we set ourselves up for failure if we try to pretend that large investments in simple strategies will do the trick. Some important conclusions emerge from the studies discussed in this paper:

- Teachers and policymakers do learn from research. In their routine scanning for new ideas, they come across and use ideas whose origins can be traced to research, although naturally people vary in how much scanning they like to do. The effects are rarely simple--the image of one study settling one decision has little or no basis in reality--but they range from the adoption of new practices to "enlightenment," or thinking about issues in new ways.

- Teachers are most apt to work on increasing their professional competence in settings of collaboration and mutual support among teachers. The social context that favors knowledge use is one where professional conversation is frequent, although this is not the usual condition in schools.

- Incentives for knowledge use can be bolstered by simultaneously creating more collaborative structures and cultures within schools (although not much is known about how to do this) and taking advantage of the momentum of mandates and other external interventions. This creates the opportunity for participatory responses to central decisions, which together may result in knowledge use and in change. The shorthand for this approach is that it blends "bottom-up" and "top-down" strategies.

- The criteria for knowledge use by both practitioners and policymakers include truth tests and utility tests. Teachers also respond to inspirational messages and to new practices that they consider likely to provide immediate payoff with individual students.

- Skilled practitioners of dissemination and technical assistance can increase the likelihood of knowledge use by assessing and building on local needs, local incentives, and the range of available knowledge resources.

We have also learned about many things that don't work, and these lessons deserve close attention. In each case, once we get past an oversimplification, we are left with important puzzles and challenges:

- Practitioners are neither passive nor (in general) resistant with respect to new knowledge. The main task of the reformer is not to install new practices in schools the way one would install appliances; nor is it to overcome resistance to knowledge. Instead, it is to foster learning, which is a very different and more complex endeavor.

- Trying to implement a fuzzy innovation is typically frustrating. However, innovations need to leave some room for adaptive implementation, because there is no evidence that an innovation can be specified so expertly that it will be implemented intact in schools. This leaves R&D with the difficult, if not impossible, problem of identifying which parts of a research-based innovation

are its irreducible minimum and therefore deserve to be retained when the innovation undergoes adaptation.

- The sponsorship of research, development, and dissemination cannot presume a linear, assembly-line model in which each of these enterprises is one stage in an orderly progression. Instead, Congress and the administration may have to seek effective ways of funding and managing a "configuration" of institutions--although a configuration is something that few people can explain, let alone boast about.

This brings us to the enduring contrast between the challenges inherent in knowledge-based school improvement--a protracted and painful process at best--and the demands inherent in the politics of federally supported educational R&D. Rather than hearing that the R&D community is grappling with difficult puzzles like the ones just noted here, the Congress and the administration want to be reassured that research can diffuse into practice quickly and efficiently. Their concept of efficiency rests on a center-to-periphery design, in which investments in R&D can be leveraged into widespread improvement through a process of technology transfer.

Regrettably, the managers of R&D have consistently accepted this challenge and pursued the wrong vision: that of rapid, center-to-periphery dissemination. The kind of infrastructure that would involve practitioners in sustained or routine knowledge use cannot be nurtured through federal programs that primarily spread the word about new ideas from central sources, yet such programs are seen as political imperatives. With the nation supposedly clamoring for educational reform, our vision of reform--what it takes and how knowledge can contribute to it--needs to be enlarged. Improving schools is as hard as it is important, and we should not underestimate the lessons that our experience has brought to light.

REFERENCES

Berman, P., & McLaughlin, M. W. (1974-1978). Federal programs supporting educational change. Vols. 1-8. Santa Monica, CA: Rand.

Brophy, J., & Good, T. (1974). Teacher-pupil relationships. New York, NY: Holt, Rinehart & Winston.

Butler, M., & Paisley, W. (1978). Factors determining roles and functions of educational linking agents with implications for training and support systems. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Charters, W. W., Jr. (1973). Measuring the implementation of differentiated staffing: A comparison of two elementary schools. Eugene, OR: Center for the Advanced study of Educational Administration, University of Oregon.

Cohen, D. K. (1987, Summer.) Educational technology, policy, and practice. Educational Evaluation and Policy Analysis, 9(2), 153-170.

Cohen, D. K. & Ball, D. L. (1990, Fall). Relations between policy and practice: A commentary. Education Evaluation and Policy Analysis, 12(3), 249-256.

Cohen, D. K., & Weiss, J. A. (1977). Social science and social policy: Schools and race. In C. H. Weiss (Ed.), Using social research in public policy making. Lexington, MA: D. C. Heath.

Corbett, H. D., Dawson, J., & Firestone, W. (1984). School context and school change. New York, NY: Teachers College Press.

Cowden, P., & Cohen, D. K. (1979). Divergent worlds of practice: The federal reform of effective schools in the experimental schools program. (unpublished report). Washington, DC: National Institute of Education.

Cox, P. L. (1983). Inside-out and outside-in: Configurations of assistance and their impact on school improvement efforts. Paper presented at the American Educational Research Association annual meeting.

Crandall, D. P. (1977). Training and supporting linking agents. In N. Nash & J. Culbertson (Eds.), Linking processes in educational improvement. Columbus, OH: University Council for Educational Administration.

Crandall, D., and associates. (1982). People, policies and practices: Examining the chain of school improvement. Vols 1-10. Andover, MA: The NETWORK.

Darling-Hammond, L. (1990, Fall). Instructional policy into practice: "The power of the bottom over the top." Educational Evaluation and Policy Analysis, 12(3), 233-242.

Darling-Hammond, L. W., Wise, E., & Pease, S. R. (1983). Teacher evaluation in the organizational context: A review of the literature. Review of Educational Research, 53(3).

Datta, L. E. (1981). Damn the experts and full speed ahead. Evaluation Review, 5(1), 5-32.

Doyle, W. (1978). A solution in search of a problem: Comprehensive change and the Jefferson Experimental Schools. In D. Mann (Ed.), Making change happen. New York, NY: Teachers College Press.

Farrar, E., DeSanctis, J., & Cohen, D. (1979). Views from below: Implementation research in education. Cambridge, MA: Huron Institute.

Fernstermacher, G., & Berliner, D. (1985). Determining the value of staff development. Elementary School Journal, 85.

Firestone, W. A. (1989, Summer). Using reform: Conceptualizing district initiative. Educational Evaluation and Policy Analysis, 11(2), 151-164.

Fullan, M. G. (1991). The new meaning of educational change. New York, NY: Teachers College Press.

Goodlad, J. I. (1984). A place called school: Prospects for the future. New York, NY: McGraw-Hill.

Griffin, G. (1986). Clinical teacher education. In J. Hoffman & S. Edwards (Eds.), Reality and reform in clinical teacher education. New York, NY: Random House.

Gross, N. G. (1979). Basic issues in the management of educational change efforts. In R. E. Herriott & N. G. Gross (Eds.), The dynamics of planned educational change: Case studies and analyses. Berkeley, CA: McCutchan Publishing Corp.

Gross, N., Giacquinta, J., & Bernstein, M. (1971). Implementing organizational innovations: A sociological analysis of planned educational change. New York, NY: Basic Books.

Hall, G. E., Loucks, S. F., Rutherford, W. L., & Newlove, B. W. (1975, Spring). Levels of use of the innovation: A framework for analyzing innovative adoption. Journal of Teacher Education, 26(1), 52-56.

Havelock, R. G. (1969). Planning for innovation. Ann Arbor, MI: Center for Research on Utilization of Scientific Knowledge, University of Michigan.

Herriott, R. E., & Gross, N. G. (Eds.). (1979). The dynamics of planned educational change: Case studies and analyses. Berkeley, CA: McCutchan Publishing Corp.

Hollifield, J. H., & Slavin, R. E. (1983, June). Disseminating student team learning through federally funded programs: Appropriate technology, appropriate channels. Knowledge: Creation, Diffusion, Utilization, 4(4), 576-589.

Hood, P. D. (1978). Alternative perspectives on education dissemination and linkage activities. San Francisco, CA: Far West Laboratory.

Hood, P. D. (1978). Statewide education dissemination capacity: A review of recent literature and current information. San Francisco, CA: Far West Laboratory.

Hopkins, D. (1990). Integrating staff development and school improvement: A study of teacher personality and school climate. In Association for Supervision and Curriculum Development, Changing school culture through staff development. Alexandria, VA: Author.

House, E. R. (1979). Technology versus craft: A ten year perspective on innovation. Journal of Curriculum Studies, 11(1), 1-15.

Howey,, K. R., & Zimpher, N. L. Profiles of preservice teacher education, inquiry into the nature of programs. Albany: State University of New York Press

Huberman, M. (1983, June). Recipes for busy kitchens: A situational analysis of routine knowledge use in schools. Knowledge: Creation, Diffusion, Utilization, 4(4), 478-510.

Huberman, M. (1985). What knowledge is of most worth to teachers? A knowledge-use perspective. Teaching & Teacher Education, 1(3), 252-262.

Huberman, M. (1987, June). Steps toward an integrated model of research utilization. Knowledge: Creation, Diffusion, Utilization, 8(4), 586-611.

Huberman, A. M., & Crandall, D. P. (1982). Implications for action. A study of dissemination efforts supporting school improvement. In People, policies, and practices: Examining the chain of school improvement, IX. Andover, MA: The NETWORK.

Hutchins, C. L. (1989). A brief review of federal dissemination activities. Knowledge: Creation, Diffusion, Utilization, 11(1), 10-27.

Hutchins. C. L. (1991, March). A brief history of regional educational laboratories. (In draft.) Aurora, CO: Mid-continent Regional Educational Laboratory.

Jackson, P. (1968). Life in classrooms. New York, NY: Holt, Rinehart & Winston.

Kennedy, M. M. (1991, Spring). An agenda for research on teacher learning. East Lansing: National Center for Research on Teacher Learning, Michigan State University

Knapp, M. S., Stearns, M. S., Turnbull, B. J., David, J. L., & Peterson, S. M. (1983). Cumulative effects of federal policies on schools and districts. Menlo Park, CA: SRI International.

Leithwood, K. A. (1990). The principal's role in teacher development. In B. Joyce (Ed.), Changing school culture through staff development. Alexandria, VA: Association for Supervision and Curriculum Development.

Little, J. W. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. American Educational Research Journal, 19(3).

Little, J. W., (1989, Summer). District policy choices and teachers' professional development. Educational Evaluation and Policy Analysis, 11(2).

Lortie, D. (1975). Schoolteacher: A sociological study. Chicago, IL: University of Chicago Press.

Louis, K. S. (1991). Supporting school improvement: Comparative perspectives on dissemination and knowledge use policies. Paper presented at the 1991 annual meeting of the American Educational Research Association.

Louis, K. S., Dentler, R. A., & Kell, D. G. (1984, December). Putting knowledge to work: Issues in educational dissemination. Boston, MA: Abt Associates, Inc., and the Center for Survey Research, University of Massachusetts.

Louis, K. S., & Miles, M. B. (1990). Improving the urban high school: What works and why. New York, NY: Teachers College Press.

Louis, K. S., & Rosenblum, S. (1981). Linking R & D with schools: A program and its implications for dissemination. Washington, DC: National Institute of Education.

Louis, K. S., Rosenblum, S., & Molitor, J. A. (1981, July). Strategies for knowledge use and school improvement. Washington, DC: National Institute of Education.

McLaughlin, M. W. (1987, Summer). Learning from experience: Lessons from policy implementation. Educational Evaluation and Policy Analysis, 9(2), 171-178.

McLaughlin, M. W. (1990). The Rand Change Agent Study revisited: Macro perspectives and micro realities. Educational Researcher, 19(9), 11-16.

Miles, M. B. (1980, June). Linkage in a new key: The DTA experience. New York, NY: Center for Policy Research.

Pauly, E. (1978). The decision to innovate: Career pursuits as an incentive for educational change. In D. Mann (Ed.), Making change happen. New York: Teachers College Press.

Piele, P. (1975). Review and analysis of the role, activities, and training of educational linking agents. Eugene, OR: ERIC Clearinghouse on Educational Management, University of Oregon.

Pincus, J. (1974). Incentives for innovation in public schools. Review of Educational Research, 44, 113-144.

Purkey, S. C., & Smith, M. S. (1985). School reform: The district policy implications of the effective school literature. The Elementary School Journal, 85(3), 353-389.

Richardson, V. (1990, October). Significant and worthwhile change in teaching practice. Educational Researcher, 19(7), 10-18.

Rogers, E. (1978, July). Re-invention during the innovation process. In M. Radnor, I. Feller, & E. Rogers (Eds.), The diffusion of innovations: An assessment. Evanston, IL: Northwestern University, Center for the Interdisciplinary Study of Science and Technology.

Rogers, E. (1962). Diffusion of innovations. New York, NY: Free Press.

Rosenholtz, S. (1989). Teachers' workplace: The social organization of schools. New York, NY: Longman.

Schon, D. (1983). The reflective practitioner. San Francisco, CA: Jossey-Bass.

Showers, B., Joyce, B., & Bennett, B. (1987, November). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. Educational Leadership, 45(3).

Sieber, S. C. (1979). A synopsis of needed research based on incentives and disincentives for knowledge utilization in public education--A synthesis of research. Red Hook, U.S. Virgin Islands: Author.

Slavin, R. E. (1989, June). PET and the pendulum: Faddism in education and how to stop it. Phi Delta Kappan, 70(10), 752-758.

Smith, L., & Keith, P. (1971). Anatomy of educational innovation: An organizational analysis of an elementary school. New York, NY: Wiley.

Thompson, C. L. (1982). Dissemination at the National Institute of Education: Contending ideas about research, practice, and the federal role. Vol VI. Andover, MA: The NETWORK, Inc.

Turnbull, B. J. (1981). Federal linkage alternatives: Types of help provided for school improvement by dissemination and technical assistance systems. Durham, NC: NTS Research Corp.

Turnbull, B. J. (1992). Research laboratories and centers. In M. C. Alkin (Ed.), Encyclopedia of educational research, 6th ed. New York, NY: Macmillan.

Turnbull, B. J., Thorn, L. I., & Hutchins, C. L. (1974). Promoting change in schools. San Francisco, CA: Far West Laboratory.

Wechsler, M. E. (1992). Reading recovery. In H. McCollum (Ed.), Best practices for children and youth at risk of school failure. Washington, DC: Policy Studies Associates.

Weiss, C. H. (1978). Improving the linkage between social research and public policy. In L. E. Lynn, Jr. (Ed.), Knowledge and policy: The uncertain connection. Washington, DC: National Academy of Sciences.

Weiss, C. H. (1980). Social science research and decision-making. New York, NY: Columbia University Press.

Weiss, C. H. (1989). Congressional committees as users of analysis. Journal of Policy Analysis and Management, 8(3), 411-431.

Williams, W., & Elmore, R. F. (1976). Social program implementation. New York, NY: Academic Press.

Yin, R. K., & White, J. L. (1984, February). Federal technical assistance efforts: Lessons and improvement in education for 1984 and beyond. Washington, DC: COSMOS Corporation.